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VOLUME VI

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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

FOR MARCH 1939

Vol. VI, No. 5 (Not for publication) May 1, 1939

ADMINISTRATION

Drawings for reproduction.--Considerable difficulty is experienced in making satisfactory photographs of large charts and graphs submitted by the several divisions of the Bureau. It should be taken into consideration that in reducing a large graph to a 5 by 7 or 8 by 10 plate involves so much reduction that thin lines are often obliterated. We would suggest that those preparing graphs and charts keep this in mind, making all letters large enough that when reduced they will be legible. All ruling and other line work should be done with a right-line or contour pen, which will give a line thick enough that when reduced it may be easily read.

FRUIT INSECT INVESTIGATIONS

Some hickory shuck worms carry over two winters.--G. F. Moznette, of the pecan-insect laboratory at Albany, Ga., reports that adults from overwintering larvae of the hickory shuck worm (Laspeyresia caryana Fitch) emerge throughout the following season and that a considerable proportion of them carry over into the second year. From pecan shucks collected in the fall of 1936, moths emerged at intervals throughout the season of 1937, the last 1 appearing on December 28. The following spring emergence was resumed on March 15, and continued until April 26. From this lot of material the total emergence was 597, of which 92 individuals carried over two winters.

Relation between fruit damage and parasitization of oriental fruit moth.--William P. Yetter, Jr., and H. W. Allen, of the oriental fruit moth parasite laboratory at Moorestown, N. J., have recently completed a report on detailed studies of the relation of the degree of parasitization of the twig-infesting generations of Grapholitha molesta (Busck) in the spring and subsequent injury to fruit at harvest time by later generations of this pest. Although it has been generally assumed that high parasitization early in the season would be followed by a minimum of damage to peach fruit later on, few actual figures have been available. The data from the more detailed experiments carried on in 1938 are as follows:

Orchard No.	Parasitization of twig-infesting larvae	Ripe fruit injured
	Percent	Percent
1	78.2	5.0
2	75.9	3.1
3	65.9	16.5
4	62.6	21.4
5	61.3	3.7
6	60.8	17.6
7	53.1	32.0
8	49.5	28.8
1-2	77.1	3.9
3-6	62.6	14.6
7-8	51.3	30.4

Pecan nut casebearer reared on pecan leaves and twigs.—S. O. Hill, of the Monticello, Fla., pecan-insect laboratory, has found that *Acrobasis caryae* Grote is not dependent upon nuts for food. Mr. Hill has reared a number of individuals from egg to adult on leaves and shoots. The series of larvae reared on twigs and leaves reached maturity in practically the same time as those reared on nuts, the average period from egg to adult being about 30 days. This offers an explanation of the occurrence of severe infestations early in seasons following years when no nuts were present on the trees and indicates that no reduction in infestation can be counted on in seasons following years of crop failure.

MEXICAN FRUITFLY CONTROL

Mexican fruitfly activity in the lower Rio Grande Valley.--Trap catches in February indicated that more than the normal number of flies were in the area and with this condition it was to be expected that many larval infestations would be discovered. A total of 1,404 such infestations was found in the lower valley and 6 additional infested properties were listed in and near the city of Laredo, in Webb County. Heretofore fruit from infested groves has been withheld from shipment, but this season fruit from the infested parts of groves has been permitted to be packed after sterilization by the high-temperature method. Sterilization plants in the quarantined area now have a daily capacity of approximately 50 carloads of fruit.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Sugarcane borer hibernation in Louisiana.--E. K. Bynum and W. E. Haley, of the Houma, La., laboratory, in further studies of sources of spring infestation by *Diatraea saccharalis* (F.), found an average of 17 live insects per acre overwintering in cane stubs. The average number found per acre during the previous 4 years was 31. The largest number of live insects were found in stubs of the variety C. P. 29/116, which is the most susceptible to borer injury of any variety now grown commercially in Louisiana. Average numbers of live insects per acre found overwintering in burned trash, left on the field at harvest time, in varieties in replicated test fields on light and on heavy soils were as follows: C. P. 29/116, light soil--97, heavy--17; C. P. 28/19 light--121, heavy--24; and Co. 290, light--48, heavy--0. Three live insects were found overwintering in 3,925 culms of Johnson grass. No sugarcane borer was found overwintering in corn or in the wild grasses Erianthus giganteus and Phragmites communis.

Varietal susceptibility to injury by sugarcane weevil.--Stubs of various varieties of sugarcane in a replicated test field were examined by J. W. Ingram, W. E. Haley, and L. J. Charpentier, Houma, for injury by Anacentrinus subnudus Buch. The percentages of buds of the various varieties killed directly by weevil larvae or through red rot entering weevil tunnels were as follows: C.P. 28/11--29.98, C.P. 29/320--21.85, C.P. 29/116--20.68, Co. 281--16.90, Co. 290--15.25, and C.P. 28/19--14. The low level of significance for differences between varieties, determined by the analysis of variance method, was found to be 12.51.

Naupactus n. sp. active at Gulfport, Miss., during the winter.--According to records obtained by J. B. Gill, Gulfport, active adults of Naupactus n. sp. were taken in the field over a period of 8-1/2 months. The first adults were taken on May 26, 1938, and the last on February 13, 1939. Freezing temperatures occurred as early as November 25 but active adults could be found on warm days as late as February 13. Adults were observed feeding on rose, clover, plantain, carpet grass, and other kinds of foliage during the winter. These adults deposited fertile eggs when confined in outdoor cages. Undoubtedly they deposited many eggs under field conditions during the winter. The average incubation period for eggs deposited during the winter was approximately 57 days, as compared with approximately 15 days for eggs deposited during June, July, and August.

Winter mortality of white-fringed beetle larvae.--B. A. App, of the Florala, Ala., laboratory, reports that the average mortality of white-fringed beetle larvae between November 1, 1938, and February 1, 1939, was 47.5 percent. The average larval mortality during the similar period of the preceding year was 52.1 percent. These records are based on soil samples taken at 72 points in 8 fields in the Florala area.

Infestation by hessian fly causes more severe winter killing.--W. B. Cartwright, Lafayette, Ind., reports that the effect of fall hessian fly infestation on cold resistance in the winter wheat varieties Leap, Poole, Michigan Amber, Kanred, and Minhardi was recorded in controlled tests completed in December 1938. The infested plants showed considerably more winter killing than noninfested plants under the same controlled conditions and was true in lots subjected to controlled freezing tests and those subjected to only freezing conditions. The range of winter survival in infested plants in controlled freezing tests was 1.3 to 13.8 percent, as compared to 11.9 to 80.2 percent in noninfested plants.

Artificial infestation of white grubs with nematodes.--H. R. Painter, Lafayette, reports that, to determine the possibility of infesting Phyllophaga larvae with the nematode Neoaplectana glaseri, 120 grubs were caged individually with 1 ounce of air-dried soil in 2-ounce tins. Grubs were arranged in 6 series of 20 tins each. A suspension of nematodes in distilled water contained 10,000 nematodes per cubic centimeter. Each series of grubs was treated with a different amount of the suspension. Treatment was made by adding to the soil in each tin a certain quantity of the suspension diluted as needed to give a certain number of nematodes per cubic centimeter or ounce of soil. A definite quantity of distilled water was added to soil, as needed to maintain proper moisture conditions. Observations were made twice weekly over a period of 2½ months. Results are shown in the following tabulation.

Series	Nematodes per ounce of soil	Grubs parasitized
	Number	Percent
A	100	65
B	500	45
C	1,000	95
D	2,500	95
E	5,000	80
F	10,000	95

Tests of insecticides against white-fringed beetle.--In summarizing insecticide tests made at Florala, Ala., during 1938 against the white-fringed beetle, H. C. Young and L. S. Henderson report that calcium arsenate gave better control than magnesium arsenate and lead arsenate. In laboratory tests poisons tested were as follows: Calcium arsenate, 87.0; magnesium arsenate, 63.8; lead arsenate, 67.1; cryolite (24.4 percent flourine), 52.3; and a cryolite-sulphur dust (10.3 percent flourine), 26.6. In field-cage tests on cotton plants, the percentages of control 92 hours after treatment for the poisons tested were as follows: Calcium arsenate, 65.8; magnesium arsenate, 55.3; lead arsenate, 53.7; and cryolite, 50.3. In laboratory tests on peanut foliage cryolite gave 75.7 percent control in 72 hours and in field cages on peanut plants cryolite gave 77.9 percent control in 98 hours. The cryolite used in these tests did not cause any plant damage when applied to peanut and velvetbean plants, but all the arsenicals used injured the plants. Cryolite gave better control when used on peanuts than when used on cotton. This was due to the fact that the beetle consumes much more leaf surface when feeding on peanuts than when feeding on cotton.

JAPANESE BEETLE CONTROL

Burning crews furnished with fire pumps.--Each elm-sanitation crew in Connecticut was furnished with 2 fire pumps on March 27. These pumps, of 5 gallons capacity each, are to be on hand at all locations where elm material is being burned. The pumps deliver a constant stream of water by slow pumping of the plunger integral with the spray rod. Two nozzle tips are available, one for a long straight spray and the other for a short, fan-shaped spray for ground fires. A strip of steel is welded to the bottom of each pump to prevent puncturing of the brass bottom by any sharp stones on which the pump might be set. The crews with this equipment have been able to backfire around fire locations in grass lands, thereby reducing one of the greatest hazards of fire spread. Sixty of these fire pumps have been assigned to Connecticut crews and 100 have been obtained for use in New Jersey.

Sanitation work centered in Connecticut "hot spot."--Four sanitation crews have been assigned to the most northern and eastern localized infection center in Connecticut, near Weston. The crews removed three elms from a small island in the middle of the Aspetuck River. These trees were not dead or devitalized, but were so located that sampling would be difficult if the trees show symptoms of foliage wilting this summer. Twig samples from one of the elms were later confirmed as containing the Dutch elm disease fungus.

Quantities of beetle wood destroyed on hospital grounds.--Cutting and burning of fallen elms was performed on the New York State Hospital property on Staten Island during the month. It is estimated that more than half of the 4,000 elms on this property will be removed in connection with the laying out of roads and the erection of 39 hospital buildings. This material must be destroyed before it can become infested with elm bark beetles.

Two first-record infections in Pennsylvania.--In March confirmations were received covering solitary elms in Wrightstown and Tinicum Townships, Bucks County, Pa., both first records for these townships. Three additional infections were reported from Upper Makefield Township of the same county, from which 13 infected trees have already been removed. Total infections found in Pennsylvania numbered 25 at the end of March.

Autogiro crew returns to home airport.--The autogiro unit that has been engaged in aerial scouting under the supervision of the Division of Pink Bollworm Control since December 2, 1938, completed its work for that division on March 11. The ship was returned to the USDA airport at Preakness, N. J., on March 15.

Increased force for nursery inspection.--A number of temporary inspectors was added to the field force in March to take care of increased demands for Japanese beetle inspection and certification of nursery and greenhouse stock. Two inspectors were assigned to a branch warehouse established in Pittsburgh by a large nursery handling both certified and uncertified stock from northern New York, southern New Jersey, and Norfolk, Va. Uncertified stock is segregated in a separate room of the warehouse, but it is necessary to check on the movement of uncertified stock to classified dealers. Three establishments purchasing uncertified stock from the warehouse and introducing it into their certified greenhouses have had their classifications revoked. An extra inspector was assigned to the greenhouse of a large shipper of Easter plants at Norwood, Pa., and another inspector was assigned for the duration of the spring shipping season to the West Grove, Pa., area. A number of large and small rose-growing establishments are located in the latter area. Early in March a temporary inspector was assigned to a nursery at Princess Anne, Md., to take care of the increased volume of work. During the month this inspector examined and certified approximately 710,000 soil-free plants. At Salisbury, Md., 3 additional inspectors were required to examine approximately 3,000,000 strawberry plants offered for inspection by a large shipper there. These inspectors worked in shifts to correspond with the hours worked by the shipping personnel. Another temporary inspector was stationed at a second Salisbury nursery to take care of strawberry-plant inspection. In Delaware an additional inspector was employed on the State payroll and was stationed at Selbyville.

Methyl bromide fumigation.--Enthusiasm for methyl bromide fumigation of nursery stock is continuing among the nurserymen. Five fumigation chambers of varying sizes and construction have been built and are in operation in New Jersey nurseries. Two additional boxes are now being constructed. A total of 75,725 plants was fumigated for certification in March. Demonstrations of this method of fumigation were made in Connecticut and Pennsylvania. Sixty nurserymen and greenhousemen attended a demonstration at the A. N. Pierson greenhouses at Cromwell, Conn. District inspectors in that territory were also present. Another demonstration was staged at the Campbell Nursery, Strafford, Pa., where Mr. Campbell is particularly interested in hydrangeas. An order for 2,000 hydrangeas of a new variety in 2¼-inch pots was fumigated and shipped the same day. Contact calls concerning the fumigant were made at the principal nurseries on Long Island, many of which are now contemplating the construction of chambers. A large iris grower who is moving his nursery from infested premises on Long Island to a noninfested section of northern New Jersey plans to erect a chamber to fumigate approximately 250,000 iris roots. A demonstration of the fumigation procedure was given at an establishment on Staten Island, N. Y., with several interested local growers present. Shippers on the Eastern Shore of Maryland and in Delaware have also been informed of this procedure.

Soil treating for Japanese beetle control in North Carolina.—Lead arsenate applications at the principal Japanese beetle infestations discovered in North Carolina during the past few years were started in Greensboro and Winston-Salem on March 27. By the end of the month 21.5 acres had been sprayed in Greensboro and 20.3 acres in Winston-Salem. Federal spray trucks, truck drivers, and supervisors have been furnished. Lead arsenate and labor for its application have been supplied through a $30,000 appropriation by the State Assembly. In addition, the State Assembly has passed a bill appropriating funds for soil poisoning of Japanese beetle in the State during the next biennium, $35,000 being appropriated for the first year and $25,000 for the second year, making a total of $90,000 appropriated by the 1939 General Assembly for Japanese beetle control work in the State.

Surveys of newly regulated areas.—In March a survey was completed of the newly regulated area in Ohio. Very few establishments were found that will require classification under the quarantine regulations. The Cuyahoga County area surveyed is said to contain more glass than any other corresponding area in the United States. It is claimed that for a distance of 1¼ miles on Schaaf Road there are 3,000,000 square feet under glass. The ranges are devoted principally to the growing of vegetable and flowering plants. Owing to the extension of the Ohio regulated area, approximately 50 establishments were removed from the classified list, since their markets are now entirely within the regulated area.

Spring nursery shipping season under way.—Large quantities of nursery stock move under certification for many of the quarantined States. Forty-two carloads of certified stock were shipped from New Jersey.

Airplane deliveries of nursery stock.—The home-garden department of one of the Pittsburgh department stores, classified under the Japanese beetle quarantine regulations, on March 15 innaugurated airplane delivery service of nursery stock to their customers in Ohio, West Virginia, and western Pennsylvania.

Nursery shipping season delayed in New England.—New England nurseries were delayed in their digging and shipping operations in March by snow and continued cold weather. Five temporary inspectors were employed to examine nursery stock being shipped from the Newport, R. I., and Manchester, Conn., districts. Digging operations started in Newport on March 2 and at Manchester on March 29. In Maine, New Hampshire, Vermont, and Massachusetts, the ground was still frozen all through March and many nurseries were covered with snow and 3 feet of snow still covered one of the large forest nurseries at Fryeburg, Maine.

FOREST INSECT INVESTIGATIONS

Distribution of European spruce sawfly in northern Europe.--W. F. Sellers, of the New Haven, Conn., laboratory, has completed a report on the distribution of the European spruce sawfly in Scandinavia and the eastern Baltic countries, based on his observations in these countries. Mr. Sellers summarizes his findings as follows: "The European spruce sawfly was found everywhere on spruce from the German-Danish border to the northernmost spruce forests of Sweden and from Lithuania to far above the polar circle in Finland. The range of distribution was from approximately lat. 55° in Denmark and Lithuania to lat. 68° 45' in Finland, which is about 180 miles north of the Arctic Circle. This included most of the Scandinavian Peninsula, Fennoskandia, and the eastern Baltic countries. The most favorable habitat was found in the one-generation area under conditions which provided a maximum of sun heat, moisture, and shelter near to the upper limits of spruce-tree growth. The least favorable habitat occurred in the drier, less humid places, especially in the two-generation area. Spruce comprised from 25 to 40 percent of the productive forest land of this tremendous area. The principal contribution of this survey was to greatly extend our knowledge of the distribution of this insect in Europe and to open up an extensive new area for parasite exploitation."

Status of oriental moth in Massachusetts.--J. V. Schaffner, Jr., and P. B. Dowden, New Haven, visited the permanent observation plots for the study of Cnidocampa flavescens (Walk.) in the vicinity of Boston, Mass., for the purpose of determining the present status of the insect and collecting cocoons to obtain data on the imported parasite Chaetexorista javana B. & B. They report that the Cambridge, Medford, Revere, Chelsea, and Winthrop plots were found to be rather heavily infested. Cocoon-collecting projects by W. P. A. workers were being carried out in Chelsea and Winthrop. In Saugus the infestation was rather light but apparently there has been an increase since 1937. There seemed to be little change in the infestation at Jamaica Plain, Roxbury, Dorchester, South Boston, Neponset, Quincy, Nahant, Everett, and Swampscott, all of which were rather light. The cocoons are being dissected to obtain data on parasitization.

Loss of insecticides applied as dusts.--A study conducted by S. F. Potts, New Haven, of the action of dust particles falling on or moving over plant leaves and needles of different physical structure, showed that in growth of medium density only from 10 to 26 percent of the dust applied actually settled on the foliage, as compared to a deposit of from 38 to 60 percent in ordinary spray mixtures. Furthermore, under average conditions air movement after dust application removed approximately 50 percent of the initial deposit. The loss by wind was greatest at the tops of the trees. In the 11 different insecticides investigated in dust form, from 2 to 26 percent (averaging 15 percent) of the initial deposit remained after 1 inch of rain. Although materials were added to these dusts which greatly increased their initial deposit and adherence, the investigations showed that more efficient methods of application are needed than those now in general use.

Note on life history of Lyctus planicollis Lec.--The Asheville, N. C., laboratory, reports that adults of L. planicollis have emerged in 9 months from sections of hickory logs that had been seasoned in an open shed for only 6 months before they were exposed to infestation. These sections were exposed to Lyctus in June 1938, and were kept in an unheated building until late in January 1939, when they were placed in a heated greenhouse. Emergence began about March 1.

Type of Black Hills beetle infestation changing.--A marked change in the portion of the boles of ponderosa pines attacked in 1938 by the Black Hills beetle is reported by Donald De Leon of the Fort Collins, Colo., laboratory. In both Utah and Colorado it has been observed that the attacks do not extend as far down the bole as in previous years. During 1936 and 1937 most of the infested trees were attacked down to the root collar and it was necessary to peel all stumps to destroy the brood left there when the tree was felled for burning. On the Roosevelt National Forest, in Colorado, from 60 to 70 percent of the stumps of the trees recently felled for treatment were uninfested and, if peeled, left what is locally called a "white stump." Such large numbers of white stumps would seem to indicate that the population of the beetle is declining and that not enough beetles are present in the forest to attack the bole down to the ground.

Interbreeding Black Hills beetle and mountain pine beetle.--According to C. L. Massey, a graduate student working under the direction of the Fort Collins laboratory, specimens of *Dendroctonus ponderosae* Hopk. from ponderosa pine on the Roosevelt National Forest in Colorado have been successfully crossed with specimens of *D. monticolae* Hopk. from western white pine on the Coeur d'Alene National Forest in Idaho. The resulting progeny has been placed in breeding cages in order to determine whether or not this hybrid strain can reproduce itself. If this strain continues to breed successfully, the progeny of a single pair of beetles, through several generations, will be carefully studied and compared for anatomical differences within the hybrid and with progeny from a single known pair of Black Hills beetles and a single known pair of mountain pine beetles. It is hoped that this study will assist in determining the validity of the two species of bark beetles.

Mountain pine beetle infestation possibly influenced by road construction.--W. D. Bedard, of the Coeur d'Alene, Idaho, laboratory reports on an instance of the apparent effect of road construction on mountain pine beetle infestations in western white pine. By chance, a portion of a roadway constructed in 1933 through a dense stand of 150- to 180-year-old white pine was included in an experimental area being used for various studies on the mountain pine beetle. As a result of these other studies, it was found that severest losses from mountain pine beetle attack had occurred immediately bordering the road, as shown in the following table.

Losses	Distance from road (in chains)			
	1	5	10	15
Trees killed	135.0	64.0	12.0	5.0
Percentage of trees killed	62.5	29.6	5.6	2.3
Accumulative total	135.0	199.0	211.0	216.0
Percent	62.5	92.1	97.7	100.0

Many trees were injured in the process of road construction as a result of root exposure, dynamite injury, fire damage, and other causes, and it is believed that these injured trees attracted the beetles to the area immediately adjacent to the road, allowing them to breed abundantly in the injured material so that their increased numbers were sufficient to kill many uninjured trees in the immediate vicinity.

Mountain pine beetle control.--J. C. Evenden, Coeur d'Alene, reports that plans are nearing completion for the institution of artificial control by the Forest Service against outbreaks of the mountain pine beetle within the white pine stands of the Clearwater and Kootenai National Forests. On the Clearwater National Forest $25,000 will be spent in combating a localized outbreak of this insect, and some $8,000 on the Kootenai National Forest. Work will start on the first of May and an effort will be made to complete both projects as early in June as possible. During the first part of these projects the infested trees will be felled and cut into uniform lengths and the logs decked and burned, as the areas are so inaccessible that salvage of this material does not appear feasible. Later in the season, when the use of fire becomes dangerous, the infested logs will be peeled. When the immature stages of this beetle are exposed through the removal of the bark, they are quickly destroyed by predaceous insects, birds, and small mammals.

Cylindrocopturus longulus Lec. attacks pine plantations in California.--In 1938 this well-known but little-understood weevil attacked from 11 to 19.7 percent of the successful 1932 and 1933 Jeffrey and ponderosa pine transplants in the Big Springs Plantation of the Lassen National Forest, according to K. A. Salman, of the Berkeley, Calif., laboratory. Though pine plantations in California have been under observation for several years, this is the most serious insect-caused injury that has been recorded. The thriftiest trees seem to have been preferred and the primary cause of the attack and outbreak has not yet been determined. C. longulus is known to infest twigs of white and Douglas firs and has been found attacking Jeffrey and sugar pine reproduction following injuries by fungi or Pissodes. Also it has been reared from insect-caused galls on the branches of Jeffrey and ponderosa pine reproduction.

Matsucoccus scale infesting juvenile ponderosa pine in northern California.--H. L. McKenzie, Berkeley, reports that Matsucoccus bisetosus Morrison was observed on young ponderosa pine near the Hat Creek work center in Shasta County, Calif., infesting the main bole, as well as the lateral branches. On the basis of preliminary scale-population counts, there was apparently a high natural mortality of this scale during the 1938 season. On November 26, 1938, F. P. Keen, of the Portland, Oreg., laboratory, sent branches of young ponderosa pine that were heavily infested with this same Matsucoccus scale, from near Burns, Oreg. In this area, according to Mr. Keen, the infested trees showed badly deformed main lateral leaders, pale and short needles, and cankerlike swellings on the twigs. An examination of this material indicated that the natural mortality of this scale in Oregon was very low and, as a consequence, much injury was being caused. Some climatic or other factor may have been responsible for the high natural mortality of this scale in the Hat Creek area.

Forest tent caterpillar outbreak at an end in Minnesota.--R. H. Nagel, Milwaukee, Wis., submits the following summary of the results obtained from the forest tent caterpillar egg-band survey recently completed on the Superior and Chippewa National Forests. The figures in the following table represent the average number of egg bands found on the twigs of 25 dominant trembling aspen trees cut in each 10-acre plot. Previous records and observations indicated that more than 50 percent of the "old bands" were deposited in 1937.

Superior National Forest

Plot No.	1	2	3	4	5	6	7	8	9	10
Old bands	100.4	59.2	6.6	49.4	33.1	20.4	5.5	9.8	10.5	1.1
1938 bands	6.3	1.5	.4	1.8	2.9	0	0	0	0	0

Chippewa National Forest

Plot No.	1	2	3	--	--	--	--	--	--	--
Old bands	17.2	17.1	16.2	--	--	--	--	--	--	--
1938 bands	0	0	0	--	--	--	--	--	--	--

The probability that the infestation, which began in 1932, would become endemic had been indicated by the sudden decline in caterpillar abundance, disclosed by the studies undertaken in 1938 in two ranger districts (the Cass Lake Ranger District on the Chippewa and the Gunflint Ranger District on the Superior). This decline in the infestation was due in part to weather conditions and in part to parasitization. Inclement weather in May 1938 caused heavy mortality among the first- and second-larval instars and appeared to be the most important factor in the decline in areas some distance from Lake Superior. In the stands near Lake Superior, where the effect of the weather was less pronounced, defoliation was noticeable in 1938, but tachinid and sarcophagid parasites were very effective against the caterpillars of the last larval instar and against the pupae.

GYPSY MOTH AND BROWN-TAIL MOTH CONTROL

Gypsy moth work temporarily suspended.—Exhaustion of emergency funds caused the temporary suspension of W. P. A. gypsy moth work after February 28 in Massachusetts, Connecticut, New York, and Pennsylvania. Sufficient funds were available in Vermont at the end of February for approximately 5 days' additional work. Notice that additional funds for the continuation of work to June 30 in Vermont, Massachusetts, Connecticut, and Pennsylvania was received on March 1, and W. P. A. gypsy moth employees were immediately instructed to return to duty on March 6. Additional funds for the continuation of work in New York were not made available at this time; however, sufficient funds were carried over from February to employ the New York force for 2 days, and arrangements were made through the State administrative office for the resumption of work on March 10. As additional funds were still not available at the end of 2 days, work was again suspended. The needed money was provided in time for the resumption of work in New York State on March 16.

Fire permits restricted by wardens because of woodland conditions.—In previous years many local fire wardens in towns where gypsy moth work was performed willingly issued permits for the burning of forest debris covering an indefinite period to supervisory employees of this project. Present forest conditions, resulting from the hurricane of last September, are such that State and local fire wardens consider the fire hazard much greater than before. They will issue burning permits for a period of 10 days only, and with the distinct understanding that no burning will be done when there is a high wind or in areas where the fire hazard is unusually great.

Barbed wire fences removed.—Barbed wire fences erected for the spraying season of 1938 are now being removed in those areas in which no gypsy moth infestation has been found this year.

Excessive precipitation causes much loss of time in Vermont.--Gypsy moth workers in Vermont lost much time in February because of inclement weather. Somewhat similar conditions prevailed during this period throughout the entire area in which Federal W. P. A. gypsy moth work was conducted. A severe ice storm during the latter part of the month forced the temporary discontinuance of gypsy moth scouting work in Fayston, Washington County, Vt., in the heart of the Green Mountain area.

Informal check proves efficiency of gypsy moth crew.--A single-egg-cluster gypsy moth infestation was found in Starksboro, Addison County, Vt., about the middle of March. It was the first infestation ever discovered in that town, which is within the barrier zone area. The egg cluster was first observed by two experienced regular employees detailed to examination and reinspection work, who were passing the location en route to a distant section of woodland where they were to work for the day. The men did not disturb the egg cluster, as they knew that a crew of W. P. A. scouts would be working through that particular locality within a day or two, and it presented an excellent and unusual opportunity to test the efficiency of the crew. On the following day the scouting crew found the egg cluster. Two additional single-egg-cluster infestations were discovered the following week by other crews, one in Ripton, Addison County, and the other in Chittenden, Rutland County.

Special permission given gypsy moth crews to use Mohawk Trail--The section of the Mohawk Trail (Massachusetts Route 2) in Berkshire County, Mass., that was completely destroyed during the severe flood last September has been partially rebuilt but is not yet sufficiently completed to be opened to traffic. Special permission was recently granted to gypsy moth crews to pass over the road in order to reach otherwise inaccessible areas in the town of Savoy.

Recent first-aid training proves valuable.--Several gypsy moth supervisory employees located in Greenfield, Mass., recently attended a course of instruction in first-aid treatment, and in turn are instructing other supervisory employees in the field. One of the employees who received the original instruction gave valuable assistance to a young man not connected with the work, who had slipped on the ice and broken his leg. As splints were lacking, the employee strapped the broken leg securely to the other leg before carrying the boy into a nearby residence and securing the services of a physician. The training obtained by these employees will undoubtedly be of service in handling injuries incurred by employees in the field.

New infestation found in Connecticut barrier zone area.--The special scouting crew assigned to duty in the town of Bethlehem, Litchfield County, Conn., which is situated within the barrier zone area, recently discovered a gypsy moth infestation consisting of two egg clusters. This is the first infestation ever located in that town.

Nursery operations delayed on Long Island.--Spring operations in nurseries located in Nassau County, Long Island, N. Y., within the area affected by the State gypsy moth quarantine, usually are in full swing by the middle of March. Heavy snow, followed by muddy ground, retarded large-scale operations until the latter part of the month. By the end of the month the nurseries were operating on a rush schedule, much of the stock being shipped in small lots for planting around private residences, consequently, inspection work increased rapidly late in March.

Scouting for the gypsy moth in New Jersey still yields negative results.—A report of gypsy moth activities in the State of New Jersey, received during the first part of March from the supervisor in immediate charge of the work in that State, indicates that a small force of State employees performed special scouting work in Sussex, Passaic, Somerset, Hunterdon, Middlesex, Warren, and Bergen Counties in February. Although inclement weather caused considerable interruption in the work, a fair amount of territory was covered. A later report indicates that these men scouted in Sussex, Morris, Somerset, and Bergen Counties during March. No evidence of gypsy moth infestation was found. Intensive extermination work performed in that State several years ago apparently eliminated the pest.

Gypsy moth inspection work increases in Pennsylvania.—The disappearance of snow late in March in the area in Pennsylvania under quarantine on account of the gypsy moth permitted the resumption of outdoor activities, and the volume of quarantine-inspection work increased rapidly. Operators are now actively cutting and moving mine props, laggings, and saw logs from the woods, and plant collectors have resumed work that was temporarily suspended following a heavy fall of snow. By the end of the month there was a marked increase in the digging and shipping of mountain laurel and rhododendron plants taken from wooded areas in the Pocono Mountains. Most of this work was being done in Carbon County, where both mountain laurel and rhododendrons are abundant. Gypsy moth ground work at infested locations was also resumed during this period.

Quarantine violators warned.—There were four violations of the Pennsylvania State quarantine on account of the gypsy moth during the first part of March. As this was the first offense for each of the quarantine violators, who were apparently unfamiliar with the quarantine law, they were officially reprimanded by the State authorities and warned that definite action would be taken in case of a second violation. The shipments that were moved in violation of the quarantine regulations included mine rails, surface stone, and a small amount of junk.

Over 5,000,000 gypsy moth egg clusters creosoted by C. C. C.—C. C. C. enrollees scouted for the gypsy moth when the weather was favorable in March, and did thinning and burning and creosoted egg clusters at heavy infestations on other days. The greater part of the work at the heavy infestation in the Granby-Simsbury area in Connecticut consisted of creosoting egg clusters that were beyond reach from the ground, which included climbing the trees and creosoting egg clusters by the use of brushes attached to long bamboo poles. Since the first of July 1936, C. C. C. enrollees have destroyed by creosoting and burning slightly more than 5,000,000 gypsy moth egg clusters, approximately 4,000,000 of which were destroyed in the Granby-Simsbury area. There was a marked decrease in the number of C. C. C. men employed on gypsy moth work at the end of March, as an enrollment period came to an end at that time and many men left camp because they had spent the maximum of 2 years in the C. C. C. The allotment of men will probably be below normal during the next 2 or 3 weeks, as it takes several weeks to fill the camps to their quotas. This periodical turnover in camp personnel results in losing men who have been well trained for gypsy moth work, and requires the training of new men. As a consequence, there is an impairment in the efficiency of the work and a decrease in volume during this period.

C. C. C. crew discovers gypsy moth infestation in the barrier zone.--About the middle of March the crew from the C. C. C. camp located at Florida, Mass., found a gypsy moth infestation just off the Mohawk Trail, near the Eastern Summit, in the town of Florida. Five egg clusters were creosoted at that time, and three additional egg clusters were found the following week. It is probable that more egg clusters are present at this infestation, but it has been necessary to temporarily discontinue work in this section because of poor ground conditions, as the snow is approximately 40 inches deep. While Florida is located within the barrier zone, and C. C. C. work is usually performed east of the zone, this crew did some scouting in that town on days the superintendent considered unsuitable for the crew to travel to the regular work assignment east of the barrier zone.

PLANT DISEASE CONTROL

Blister rust control in sugar pine region.--With the opening of the field season but a few weeks away, the white pine blister rust control program in the sugar pine region is rapidly assuming definite form. Control work will be carried on by the Bureau of Entomology and Plant Quarantine, the Forest Service, and the National Park Service. The work plans call for 6 camps, using 600 relief laborers, operated by the Bureau, and 14 camps with 550 relief laborers, operated by the Forest Service. In addition, the Forest Service and the National Park Service will each use the labor from 6 C. C. C. camps on National Forest and National Park lands, respectively. In Oregon the Bureau expects to use 4 camps with 400 relief laborers. The program includes the beginning of *Ribes* eradication on the Tahoe National Forest and Sequoia National Park. Scouting for white pine blister rust in California will probably not begin before July 1, and will be concentrated in the Sierra Nevadas.

State blister rust legislation.--The New York State Legislature has passed a bill authorizing counties to appropriate funds for the control of white pine blister rust. The bill reads in part as follows: "The Board of Supervisors of any county may from time to time appropriate and expend such sums as it may deem proper, not exceeding $10,000 in any one year, for the purpose of suppressing and controlling white pine blister rust within the county, and may raise money for such purpose by tax on the taxable property of the county. The work for which such moneys are so raised and appropriated shall be done under the direction and supervision of the Department of Conservation of the State of New York. In carrying on such work, the board of supervisors may employ such help as may be necessary, to be selected from persons residing in the county. Employees engaged in such work may enter upon any lands, whether publicly or privately owned, for the purpose of suppressing and controlling white pine blister rust and no action for trespass or other cause shall lie therefor. This act shall take effect immediately."

Phenological data.--H. N. Putnam, in charge of blister rust control work in the North Central States, informs us that while on a field trip in Ohio on March 29, he found aecial blisters swollen and projecting through the bark but not yet opened. *Ribes* buds were also swollen and beginning to burst. H. E. Yost, of Maryland, reports that he found a few blister rust cankers beginning to fruit in Allegany County on March 6. In Tennessee the mild weather early in March resulted in the rapid development of new leaves on *Ribes*. In Virginia J. G. Luce reports *Ribes* appearing in leaf near the Shenandoah National Park early in March.

Blister rust meetings held at C. C. C. camps.—A series of blister rust meetings was held in Pennsylvania during the week beginning March 20, a meeting being held each night at different C. C. C. camps from Monday to Friday, inclusive. The 5 meetings had a total attendance of about 915. District leader N. H. Harpp, assisted by State leader R. P. Fatzinger and by Mr. Zury, gave a short talk at each meeting, followed by 2 reels of film on *Ribes*-eradication work, after which the men had an opportunity to ask questions and examine blister rust posters and specimens. The C. C. C. men seemed very much interested and it is felt that the meetings were well worth the time and effort required. Meetings were also scheduled for the following week.

COTTON INSECT INVESTIGATIONS

Hibernation of boll weevils in surface trash.—Between January 26 and February 24, 1939, F. F. Bondy and C. F. Rainwater examined 200 square yards of surface soil, leaves, and trash taken from 10 localities in the vicinity of Florence, S. C. In an effort to obtain as many weevils as possible, all samples examined were collected near the edge of cotton fields and not more than 50 feet into the woods. Live boll weevils were found in each of the localities where trash was examined, the numbers ranging from 726 to 13,804 per acre with an average of 3,582 weevils per acre, as compared to 1,476 weevils per acre in samples collected in similar localities in 1938. At Tallulah, La., where the minimum temperatures were lower and the rainfall higher than at Florence, S. C., during the winter of 1938-39, G. L. Smith, A. L. Scales, M. T. Young, and G. L. Garrison examined 236 square yards of surface soil, leaves, and trash taken from 10 localities. Live boll weevils were found at the rate of 225.5 weevils per acre, as compared to 186 weevils per acre in the spring of 1938; 50 per acre in 1937; and 140.8 per acre in 1936. Heavy rainfall in January and February 1939 flooded many acres in Madison Parish, La., where these studies were made, and the effect of water standing on the soil surface in reducing the population of hibernating weevils was noted in the surface-trash examinations made in the fall of 1938 and in the spring of 1939. In the fall 22 live weevils were found in 32 square yards of surface trash on 1 plantation. Much of the soil on this plantation was covered with water several times during January and February, and in March only 1 live weevil was found in 48 square yards of surface trash. On another plantation, where the ground was flooded several times during the winter, 9 live weevils were found in 32 square yards of surface trash in the fall and none were found in 28 square yards of trash in the spring; but on another part of this plantation where the water did not stand on the soil surface, 11 live weevils were taken from 32 square yards of surface trash in the fall and 7 from 52 square yards in the spring. At Gainesville, Fla., C. S. Rude and L. C. Fife examined 66 square yards of surface soil, leaves, and trash, most of which were taken at the edge of a cotton field, and found boll weevils at the rate of 733 per acre. No previous records from Gainesville are available for comparison.

Hibernation of boll weevils in Spanish moss.—The results of fall and spring examinations of Spanish moss collected in the vicinity of cotton fields in Madison and Tensas Parishes, La., during the 14 years 1925-39 are reported by R. C. Gaines, et al, of the Tallulah, La., laboratory, as follows:

Winter of	Live weevils per ton of moss at time of examination in	
	Fall	Spring
	Number	Number
1925-26	280	0
1926-27	242	4.0
1927-28	21	1.0
1928-29	240	3.8
1929-30	189	.2
1930-31	49	33.0
1931-32	724	462.3
1932-33	881	1.3
1933-34	365	40.8
1934-35	192	5.2
1935-36	19	0
1936-37	141	23.0
1937-38	51	1.4
1938-39	4	6.7

This spring 1,780 pounds of moss were examined, and 6 live weevils, or 6.7 per ton of moss, were found. From this table it is seen that the 4 weevils per ton last fall was the smallest number found since records were started in 1925, while for the spring examinations there are only 4 years in which a larger number has been found than in 1939. The winter of 1938-39 was rather mild, with the exception of one cold spell in November, when a minimum of 15° F. occurred. The fall collection of moss was made after this low, and the temperature did not go as low as 15° again during the winter. In the fall examination of moss 94.3 percent of the weevils found in the moss were dead, whereas in the spring examination only 64.7 percent were dead. This unusual condition was due to the fact that the Spanish moss for the fall examination was collected immediately following and during a period of extremely cold weather for that region. The low temperatures caused the high mortality of 94.3 percent of the weevils. During the winter many of the dead weevils fell out of the moss so that when moss was collected for the spring examinations only 64.7 percent of the weevils remaining in the moss were dead. In general, the number of weevils per ton of Spanish moss in the fall is an index as to the abundance of the weevils that developed in nearby cotton fields during the fall months; and the number of weevils per ton of Spanish moss in the spring depends on the number there in the fall, and on the weather conditions, especially temperatures, during the winter. In all previous years the spring examinations of Spanish moss have shown that there was a marked reduction in the number of live weevils, as compared to the fall examinations. This is what would be expected as many weevils are killed by low winter temperatures. If the fall examination in 1938 had been made prior to November 25, the number of live weevils would have been much larger than 4 per ton of Spanish moss. The coldest weather of the past winter at Tallulah, La., occurred on 5 days beginning November 25, 1938, when minimum temperatures of 19°, 20°, 18°, 15°, and 21° were recorded. There was probably no real increase during the winter in the number of live weevils per ton of Spanish moss, but there is an apparent increase because the sample of 1,039 pounds of Spanish moss collected on November 28, 29, and 30 was not large enough to accurately indicate the number of live weevils per ton of Spanish moss.

Development of pink bollworm larvae in relation to age of cotton squares.—While studying the biology of the pink bollworm at the Presidio, Tex., laboratory, S. L. Calhoun and L. C. Fife made observations on the larval development in relation to the age of the cotton square. In June, when cotton first began to fruit, squares were tagged so that their age was known. Newly hatched larvae were placed on the squares when they were 10 and 11 days of age and the squares enclosed in cellophane bags. A month later the same procedure was followed with squares 16 and 17 days old. The mean air temperatures, as recorded by a thermograph, were 85.9° and 84.6° F. for the two periods. Squares which were 10 and 11 days old when infested were removed on the date of blooming or when they shed prior to blooming as a result of feeding by the pink bollworms. Squares which were infested when 16 and 17 days old were removed after 7 days, regardless of date of blooming. The removed squares were placed in individual vials in the insectary with sufficient water for completion of insect development. The average feeding time of the larvae in the older squares was 7.08 days and in the younger squares, 12.42 days. The complete cycle from egg deposition to emergence of adult was 22.57 days for larvae developing in squares 16 and 17 days old and 28.33 days for larvae in squares 10 and 11 days old at the time feeding began. The difference of 5.34 days in the developmental period occurred almost entirely in the larval stage, as there was only a slight difference in the prepupal and pupal stages and the incubation period was identical in the two series. The larval feeding period was adjusted to the development of the squares so feeding was completed or almost so at the time the flowers opened. The upper and lower age limits of the squares in which pink bollworm larvae can develop were not determined. In cotton bolls the developmental period averages approximately 33 days. Thus the appearance of the squares earlier in the season, and the shorter larval development period permit six generations a year in squares, whereas only three and a partial fourth generation develop in bolls.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Control work in the Big Bend of Texas.—The 2-year special control program for the Big Bend of Texas and adjacent areas in Mexico, for the purpose of reducing the heavy pink bollworm infestation, gives promise of a very successful outcome. This plan, which called for the early planting of the 1938 cotton crop, followed immediately by the clean-up of fields, with a delayed planting date until April 20 for the 1939 crop, is being carried out with splendid cooperation on both sides of the Rio Grande. Farming operations have made excellent progress in all sections during March in regard to having the land in readiness by the April 20 planting date. Most of the farmers express the belief that, so far as the pink bollworm is concerned, they have excellent prospects for a good crop. The next step in this program will be to endeavor to prevent any stub cotton from fruiting prior to the fruiting of field cotton. Indications are that there will not be a great deal of this menace, after the severely cold weather of last winter. An effort is being made to interest farmers in this phase of the work so that they will cut all stubs out at the time field cotton is chopped; however, this matter will be watched closely and no stub cotton will be allowed to remain in the fields. In the Ojinaga district, on the Mexican side of the river, the inspector in charge is withholding all cottonseed until planting time. Mexican inspectors have contacted each section of the district, advising their farmers of the planting date and instructing them to keep out the stub cotton. They expect to keep close inspection as the season advances to see that this is being done; however, in other than abandoned fields, little difficulty is anticipated.

Pink bollworm eradication in Salt River Valley of Arizona.--The winter field clean-up campaign which has been in progress in the Salt River Valley since December, on account of the finding of pink bollworm infestation in that area early in the fall of 1938, was brought to a close on March 10. This work consisted of cutting all 1937-38 cotton stalks and cleaning of fields, as well as an educational campaign carried out with the aid of the Division's motion picture portraying the work of this project, with reference to the benefits which should accrue to farmers by delaying the planting of short-staple cotton until April 10 and allowing no stub cotton to fruit, either in cultivated fields or on land laid out on account of A. A. A. allotments. After the initial program was completed, the rest of the month was devoted to an intensive drive to destroy all stubble, as warm weather during most of March gave a decided impetus to the growth of such cotton plants which, under favorable conditions, will begin to bear squares in 30 days or less. Contact work with farmers has been continued without let-up, and practically all are cooperating wholeheartedly in the entire program. Cutting of stalks has also been continued in additional territory. A spring clean-up and control program, having as its objective the destruction of all cotton stalks and stubble on land which will be laid out in 1939 in the area susceptible to infestation by short moth flight from known infested fields in the Gilbert area of the Salt River Valley, will begin on April 10.

Control work in the lower Rio Grande Valley of Texas.--Cotton planting in the quarantined area of the lower Rio Grande Valley, where infestation of the pink bollworm was first found in 1936 and where a special control program has been carried on since that time, was practically completed at the close of March. Throughout most of this area there was a deficiency of moisture during March, in both irrigated and nonirrigated lands, which materially retarded the growth of cotton. This is probably aiding the program for pink bollworm control, because it has the effect of a delayed-planting date, which is one of the requirements in the Big Bend and in Arizona. A retarded-planting date has not been required for this valley because of the difficulties of getting a stand of late-planted cotton. With the appearance of a considerable quantity of blooms on old stalks in this lower Rio Grande Valley quarantined area, field inspections were begun, to determine whether the pink bollworm could be found. Inspections were first concentrated in the area around Brownsville, where infestations were heaviest last season, and later on the Mexican side along the new highway, where last season's stalks had been left for a distance of several miles. During the month a total of 17,824 forms, consisting of squares, blooms, and bolls, taken from 17 fields, were examined on the American side, showing negative results as to pink bollworm infestation and an average boll weevil infestation of 20 percent. In Mexico 9,714 forms were examined, with an average boll weevil infestation of 33 percent, but no evidence of pink bollworm infestation was found.

Wild-cotton eradication in southern Florida.--The work of eliminating the pink bollworm from southern Florida, in order to prevent it from reaching the main Cotton Belt, by destroying its host, wild cotton, was carried on with excellent progress in all areas. The second cleaning of the season was well under way in all sections at the beginning of March. More than 6,000 acres was scouted for wild cotton plants along the west coast during the period and the work of clearing vegetation from wild-cotton colonies, for the purpose of admitting sunlight and air to hasten the germination of cottonseed, was also continued along the west coast. The first cleaning of Sound Point, the Dade County Mainland, and Long Key,

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was completed during the latter part of March. These were the last three sections in the district to be cleaned for the first time this season. During the month approximately 40 acres was cleaned for the first time. Practically all this acreage was in the Cape Sable section and was located during the aerial survey. Most of the wild cotton plants removed from this area appeared to be about 2 years old, and it is believed the seed was disseminated during the 1935 hurricane. Work inaugurated in January in the Cape Sable area, where practically half of the total wild-cotton acreage in southern Florida is found, was brought to a temporary close on March 28, owing to exhaustion of funds set aside for wild-cotton eradication in that section. The camp and all equipment was left intact in order that operations could be resumed promptly if additional funds were made available. At the time operations were suspended, between 55 and 60 percent of the area had been cleaned for the second time. During this second recleaning only a small number of fruiting wild-cotton plants were found.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Effect of hot-water treatment on flowering of narcissus bulbs in Pacific Northwest varies with region of origin.--Records made upon the production of flowers by narcissus bulbs grown in several sections of Oregon and Washington and which had been given the hot-water treatment used ordinarily in combating the narcissus bulb fly (*Merodon equestris* (F.)) and the bulb nematode (*Ditylenchus dipsaci* (Kuhn) Filipjev), and then forced in the greenhouse, indicated that the bulbs from the more southern regions were affected by the treatment to a lesser extent than those from the more northern regions, according to a report submitted by C. F. Doucette, of the Sumner, Wash., laboratory. The bulbs were treated early in the summer of 1938, 6 to 8 days after being dug, then were dried and placed in storage throughout the summer at the Sumner laboratory. In the fall they were planted in flats and handled in the same manner as greenhouse forcing stocks in commercial practice. When the bulbs bloomed the flowers were graded on a scale of 1 to 10, in which grade 1 represented a perfect flower. The average grades of the flowers from the several lots were as follows:

Production region	Average grade of flowers from--	
	Treated bulbs	Untreated bulbs
Oregon:		
Curry County (1) (southern coast)	2.78	1.28
Curry County (2) (southern coast)	1.67	1.38
Washington:		
Clark County (southern Washington)	3.50	1.25
Pierce County (lower Puget Sound)	6.45	1.17
Skagit County (northern Puget Sound)	4.41	1.08

Late-season treatments of the same stocks were made also on September 24, 1938, primarily for comparison with the flowering performance of imported bulbs. In recording the results of these late-season treatments it was found that the flowers were aborted on practically all of the bulbs grown in the Pacific Northwest, but the treated imported bulbs produced practically as many flowers as the untreated, indicating that the bulbs imported during the fall of 1938 are less affected by the hot-water treatement than any of the domestic stock included in the experiment.

Sweetpotato weevil adults survive winter under unfavorable conditions.--K. L. Cockerham and O. T. Deen, of the Sunset, La., laboratory, report that, as a result of experiments performed during the fall and winter of 1938-39, it was found that adults of Cylas formicarius (L.) are able to survive the winter under unfavorable conditions. Up to the end of March 3 female C. formicarius adults had lived 126, 128, and 129 days, respectively, without food, in cages located on a typical headland containing only grasses and weeds. The grasses and weeds in this cage were known not to be host plants. This is the second year that a small percentage of C. formicarius adults have survived the winter season without food, starting from the time of harvest during the preceding season until the time of the season when the sweetpotato plants were sprouting in the seed beds. In another series of experiments adults of C. formicarius were collected from the cleaned area of sweetpotato fields for slightly more than 1 month following the clean-up, indicating that such adults could exist for some time without the shelter of host plants or other host material. It was demonstrated, however, that nearly all of the sweetpotato weevil adults left the cleaned area of the field under observation within a period of 30 days after the expiration of the clean-up and none of the weevils placed in cages on the cleaned area, without protection or food, survived the winter. Weevils emerged throughout the winter from sweetpotatoes exposed to winter freezes and also from sweetpotatoes covered with soil. The weevil emergence, as well as the decay of the potatoes, was much more rapid in the potatoes left on the surface of the soil than in those covered with soil. Many living specimens of the sweetpotato weevil in all stages were found in sweetpotato crowns and tubers taken from the field each month during January, February, and March. These results demonstrated that sweetpotato weevil adults will survive in sweetpotatoes, even after the latter have been exposed to severe freezes; hence it is necessary to remove from cleaned-up fields not only the sweetpotatoes but also any green material of the plant which may remain.

Undisturbed tobacco fields provide favorable overwintering quarters for flea beetles.--Intensive studies on the hibernation of the tobacco flea beetle (Epitrix parvula (F.)) by Clemence Levin, of the Oxford, N. C., laboratory, disclosed that last winter the greatest number of adults of the flea beetles were found in dead grass near old tree stumps in an undisturbed tobacco field. As many as 110 flea beetles were taken from a single square-foot sample in this environment late in March. The hibernation studies indicated further that the flea beetles were apparently well distributed over the wooded area where tobacco-plant beds were located and that tobacco stalks of the 1938 crop characterized by the presence of debris from suckers appeared to harbor more flea beetles than stalks that were not accompanied by such debris.

In southern Idaho high beet leafhopper populations may be expected in fields near breeding areas.--According to reports submitted by J. R. Douglass and his associates, of the Twin Falls, Idaho, laboratory, it appears, on the basis of conditions in February, that high populations of Eutettix tenellus (Bak.) may be expected during the coming season in the beet-growing areas located near the leafhopper breeding grounds of southern Idaho. These conclusions were based on the following determinations, made in a study of beet leafhopper conditions in the area indicated, beginning with the spring of 1938: (1) An unexpected situation occurred on warm days of April and first part of May 1938, when a large number of overwintered leafhoppers moved into the cultivated areas. Undoubtedly this large movement of overwintered leafhoppers, together with the premature drying of annual spring-breeding host plants in certain areas, affected the magnitude of the spring generation, which was approximately one-third as large as in 1938. Above-normal fall temperatures in 1937, with sufficient precipitation, permitted a good germination of downy chess grass, not a host of the beet leafhopper. Excessive precipitation in March 1938 permitted a much more dense and widespread germination of this plant, which resulted in excellent stands of the downy chess grass in certain areas ordinarily occupied by Russian-thistle. Dense stands of downy chess grass intermixed with Russian-thistle, the most favorable summer host plant, reduced the suitability of such areas for the reproduction of large numbers of leafhoppers. The unfavorable situation with respect to the summer host plant complex, plus a low population of leafhoppers in the spring, were important factors in the production of the lowest fall population of leafhoppers recorded during the last 5 years. (2) Weather conditions during October 1938 were generally ideal for widespread germination of mustards, which constitute the principal host plants of the beet leafhopper during the fall and winter. The first killing frost in southern Idaho occurred on October 18, 1938. Consequently, the beet leafhopper left its summer and holdover host plants with little delay and entered the winter under favorable conditions. (3) Fall surveys in the Sailor Creek sagebrush area demonstrated the presence of the lowest late-fall population of beet leafhoppers during the last 4 years. (4) The winter of 1938-39 was comparatively mild and dry, which permitted a high percentage of winter survival of the existing beet leafhopper population, as confirmed by recoveries obtained in hibernation cages. (5) Experience has shown that an early spring advances the date of leafhopper movement from the breeding grounds into the cultivated areas. It is possible, however, that if a cool, wet spring develops, similar to that of 1938, this movement into the cultivated areas will be delayed and reduced in magnitude. (6) Regardless of conditions, high populations of the beet leafhopper may be expected to occur in beet-growing areas situated near the leafhopper breeding grounds. (7) Since spring conditions affect leafhopper populations profoundly, as well as the time of their movement into the beet fields, a second statement, based on studies made in the field during the spring, will be issued later.

INSECTS AFFECTING MAN AND ANIMALS

Development of blowfly traps.—At the Uvalde, Tex., laboratory, several types of fly traps are being tested in the field, and others are under design and construction. Preliminary work indicates the feasibility of returning captured flies to the bait pan, thus using them as accumulative bait. Using the above principle, a standard cone trap was converted into a self-emptying type. This trap is in use and is being checked with a regulation trap. Another trap of similar design, but intermediate in size between the standard cone trap and the large box trap, has been constructed and placed in operation. The design of this trap was based on practical demands to reduce labor and attention required, to make it self-emptying, and to use the captured flies as additional bait. If the performance of this trap is entirely successful its operation will be almost continuous and automatic. In shape and size it is cylindrical, 28 inches in diameter by 48 inches high. A No. 3 galvanized tub is used as a bait pan. Neither of the above traps has been in operation long enough to report results.

Control of short-nosed ox louse.--O. G. Babcock, of the Sonora, Tex., laboratory, reports apparent control of *Haematopinus eurysternus* Nitz. by the use of a dip consisting of 100 pounds of wettable sulphur and 10 pounds of cube powder, containing 5 percent rotenone, to 1,000 gallons of water.

Control of cattle grubs.--R. W. Wells reports the results of a series of tests on the use of derris and cube washes on the backs of cattle for control of cattle grubs in Colorado and Iowa. Using derris and cube washes (16, 12, 8, and 4 ounces, and 4 ounces of soap per gallon of warm water) on the backs of cattle, it was found that 1 quart is sufficient to treat only 3 animals with such winter coats as are found in Colorado and Iowa. After distributing the powdery wash over the back it was found essential to devote 2 man-minutes of rubbing the wash into the hair with the hands. Rubbing with a brush is less efficient. Twelve ounces of the powder per gallon of wash is as efficient as 16 ounces with an equal amount of rubbing. Eight ounces of powder per gallon with the 2 man-minutes of hand rubbing was survived by approximately 9 percent of the grubs, whereas with 16 ounces per gallon the best result was a survival of 3.15 percent. The powders were reported by the Division of Insecticide Investigations to contain rotenone and extractives as follows: Derris, 5.2 percent rotenone and 15.5 percent total extractives; cube, 4.7 percent rotenone and 21.1 percent total extractives. In all, 186 cattle were used, each being handled twice, first for application of the wash and secondly for extraction of the grubs totaling 4,708. The cube powder gave better results than the derris powder.

Detachment of botfly eggs from horsehair.--S. W. Simmons, of the Ames, Iowa, laboratory, has found that eggs of *Gasterophilus nasalis* (L.) and *G. intestinalis* (Deg.) can be successfully removed from horsehair by treatment with trypsin. A 1/2-percent aqueous solution brings about detachment in from 6 to 7 hours, operating at 38° C. and at a pH of 7.2-8.0. The time is increased to 24-30 hours by decreasing the strength to 1/4 percent. Even a 1/16-percent solution is effective, but requires 50 hours to remove the eggs. After treatment a strong spray of water is advisable to force off eggs that have been loosened but which have failed to drop. Tests of breaking strength and visual examination for changes in elasticity indicated no injury to the hair by trypsin. Boiling hydrochloric acid is effective for egg removal. This may be used in strengths of from 2 to 10 percent. The more concentrated gave quicker results, causing detachment in from 12 to 20 minutes. Serious effect on the hair from the acid treatment was not noted, although it is known that long exposure of horsehair to hydrochloric acid affects tensile strength, swelling, and birefringence. Sulfuric, nitric, and formic acids were unsatisfactory. None of the other agents tried were effective. Horsehair detached from the animal has many commercial uses. The presence of attached botfly eggs detracts from its value in many instances.

Treatment of screwworm wounds.--Roy Melvin, of the Menard, Tex., laboratory, reports that a semifield test for treatment of screwworm cases, in which diphenylamine and diphenylamine conditioned with sugar and boric acid were used, was completed. The protection was excellent with all three treatments. The healing records did not show any marked difference between treatments.

FOREIGN PARASITE INTRODUCTION

White-fringed beetle investigations in South America.—Since his arrival in Argentina in September 1938, F. A. Berry has been making a study of the status of the pest and of related species and has also conducted a search for natural enemies. *Naupactus leucoloma* Boh. was found to occur quite generally in Argentina, Uruguay, and southern Brazil. In general, the species is not sufficiently abundant to be a crop pest. The highest populations were found in the more arid regions. The heaviest infestations of grubs were almost invariably found in unirrigated alfalfa, but in most cases those were of a related species, *N. densus*. At times considerable areas of this crop are completely destroyed. A striking feature of these infestations is that the center of infestation within a field shifts from year to year and consequently there is seldom an abundance of grubs at the same point in successive years. Evidence on this point was revealed by an examination of feeding scars on the main roots in the older fields. Many fields showing heavy previous feeding were almost entirely free from infestation when examined. Observations were begun in Uruguay in January 1939, and the pest appears to be more abundant and uniformly distributed in that country than in Argentina. Thus far no indications of the occurrence of parasites or specialized predators have been found in either country.

FOREIGN PLANT QUARANTINES

Stopping them at the line.—A Mexican was apprehended on March 31 by Messrs. Phillips and McCoy, immigration border patrolmen, after he had illegally entered the United States from Mexico in the vicinity of Brownsville, Tex. At the time he was apprehended this Mexican had in his possession 58 avocados with seed in them. Upon questioning, he admitted he had waded the river and was bringing the avocados over to give to a friend. He also stated that he knew he was doing wrong by wading the river and bringing the avocados in. He was filed upon by the immigration authorities under Section 2 of the Immigration Act on the charge of illegally entering the country. When the charge of smuggling prohibited fruit was brought to the attention of the United States district attorney of Brownsville, it was decided that, inasmuch as Federal Judge Allred was to hold court in Brownsville on April 1, it would be best not to file on this Mexican but merely to have him appear individually before the judge and have the plant-quarantine violation explained, along with the immigration charges. The judge's decision was: "I sentence you to 90 days in jail, and I want you to understand that I would suspend the sentence had you not had the avocados in your possession. This country must be protected against insect pests." Incidentally, the avocados were found to be infested with larvae of *Conotrachelus* sp.

Cactus plant intercepted in mail.—While examining foreign mail at Laredo, Tex., an inspector picked up a newspaper which was rolled up as usual for mailing. The feel of the paper was a little unusual and the roll not quite so round as would be expected. Upon investigation, it was found that a square had been neatly cut out and removed through several thicknesses of the inside of the paper, thereby making a fine boxlike hiding place for a small cactus plant. The parcel was called to the attention of the customs inspector and seized as smuggled goods.

Straw jackets.—Scotch whisky may be "Christmas spirits" for some but it is "[illegible]" for the plant-quarantine inspectors at Mobile. This was revealed after the schedule and itinerary of the American S. S. *City of Alma* was speeded up and changed in order to get 10,220 cases of whisky, wine, and various liquors into port, to be forwarded by rail to the Midwest for Christmas sales. The vessel arrived at Mobile on December 14 and inspection of the cargo after it had been placed on the dock revealed that 2 lots, consisting of 1,050 cases, were packed in straw jackets contaminated with vetch, in the seeds of which living specimens of *Bruchus luteicornis* Ill. were found. The importer's representative employed 15 laborers to replace the infested straw. They worked 8 hours the first day and 6 hours the following day at this operation. The jackets made 5 large truckloads. They were removed to a nearby spot and destroyed by burning.

Pink bollworm larvae in mail from Italy.--During the procedure of appraising a mail shipment of fancy pillow covers and dresses from Italy, addressed to a local resident in San Jose, customs appraiser Lester Johnson at San Francisco noted the presence of a very small tuft of cotton with a few adhering seed. Immediately he held the entire shipment for the attention of the plant-quarantine inspector. When examined by him, approximately 30 cottonseed were found. These were infested with live larvae of the pink bollworm (*Pectinophora gossypiella* Saund.). There was nothing to indicate whether the presence of the cotton was intentional or accidental. The sender may have innocently included it, knowing that cotton is grown in California and thinking the addressee might care to try this seed. It was only the alertness of the appraiser, and his interest in fully cooperating with other governmental agencies, that prevented the delivery of a shipment which might have been the means of introducing a major insect pest to a new area.

Fruitfly in officer's quarters.--During the recent inspection of officers' quarters on a Hawaiian passenger liner at San Pedro, three figs infested with larvae of the Mediterranean fruitfly, were found in the Third Officer's room. A careful search of the room failed to disclose any larvae; however, in order to safeguard against the possibility of larvae having emerged and crawled into crevices, the room was carefully sealed and fumigated with hydrocyanic acid for 1 hour.

Notes on nematodes.--Ginger rhizomes from Peru entering under special permit at San Francisco were inspected on September 7, 1938, and approximately 35 percent of them showed decay, in which nemas were present. Material was submitted to the Division of Nematology for study and the findings are published in a paper by G. Steiner and J. R. Christie (Proc. Helminthol. Soc. Wash. 6:26-28; Jan. 1939). Three species of nema were found: *Diploscapter coronatus* (Cobb) Cobb, *Neocephalobus peruensis* n. sp., and *Aphelenchoides hunti* Steiner. The first named is found in ginger in various parts of the world but its status is not known. *A. hunti* was intercepted in husk tomato from Mexico and lily bulb from Japan (Bur. Ent. & P. Q. News Letter, vol. 3, no. 1, p. 24, Jan. 1936). Studies of this species as found on the ginger rhizomes from Peru show that it is parasitic on fungi. *N. peruensis* Steiner and Christie feeds on bacteria, judging by the contents of the intestine, although the numerous bacteria present in the end portion of the intestine showed no changes attributable to digestive action and apparently had not served as food. *Rhynchostylis retusa* stems of six plants in cargo from Ceylon were found to be infested by *Panagrolaimus subelongatus* (Cobb) Thorne, *Aphelenchoides parietinus* (Bastian) Steiner,. and a form that was at first taken to be *Ditylenchus dipsaci* (Kuhn) Filipjev. Detailed study has shown that the latter is closely related to *Ditylenchus intermedius* (de Man) Filipjev, but further material must be studied before it can be determined whether or not it is a new species. Any nemas found in tropical material and having the appearance of *D. dipsaci* should be forwarded for study by the Division of Nematology.

Pathological interceptions of interest.--*Albugo bliti* (Biv.) O. Kuntze was intercepted on amaranths from Cuba on February 13 at Miami. *Bacterium savastanoi* E. F. S. was intercepted on olive cuttings in baggage from Portugal on March 30 at New York. *Colletotrichum lagenarium* (Pass.) Ell. and Hals. was intercepted on March 7 at New York in a shipment of *Momordica charantia* from Cuba. *Cytospora sacchari* Butl. was intercepted at New York on March 16 on sugarcane cuttings in baggage from Syria. *C. vitis* Mont. was intercepted on grape cuttings in baggage from Greece on February 23 at New York. A disease intercepted on tomato in baggage from Mexico on February 15 at Brownsville has been determined as *Helminthosporium tomato* Ell. and Bart., since it fits the description, but it might well be put in the genus *Brachysporium*. *Leptosphaeria innamotoi* Miyabe was found March 13, at New York on rice hulls used as packing in a mail package from Japan. *Melanconium* sp. on *Cymbopogon citratus* leaves from Puerto Rico, intercepted at New York on February 21, does not seem to fit any of the named species. *Pestalozzia macrotricha* Kleb. was intercepted at New York, on March 1 on leaves of an azalea plant in baggage from Italy. *Phoma auerswaldii* Allesch. and *Phoma stictica* B. and Br. were intercepted on February 1, at San Francisco on box plants in special permit shipments from Holland. *Puccinia graminis* Pers. found on wheat straw jackets on wine from Spain and collected at Detroit on March 27 was of interest in that from 20 to 25 percent of the teliospores were 3-celled.

Entomological interceptions of interest.--A living larva of the Mexican fruitfly (*Anastrepha ludens* Loew) was intercepted at Laredo, Tex., on January 14 in a tangerine in baggage from Mexico. Three hundred and twenty-six larvae of the fruitfly *Anastrepha mombinpraeoptans* Sein were collected on September 13, 1938, in jobo (*Spondias mombin*) fruits in the field at Arecibo, P. R. Living larvae of the pyralidid *Hellula phidilealis* (Wlk.) were intercepted at New York on December 27, 1938, in the leaf stems of Swiss chard in cargo from Cuba. Living specimens of *Aulacaspis crawii* (Ckll.) were taken at San Francisco on January 9 on an unidentified plant in baggage from Japan. Adults of the hairy vetch bruchid (*Bruchus brachialis* Fahr.) arrived at Mobile, Ala., on October 4, 1938, in vetch seed in cargo from Sweden. Galls of the Philippine orange moth (*Prays citri* Mill.) were found at Boston on December 9, 1938, on pomelos (*Citrus maxima*) in ship's stores from the Straits Settlements. Specimens of the whitefly *Dialeurodes decempuncta* Quaintance and Baker were intercepted at Honolulu, T. H., on April 29, 1938, on a bulala oil tree (*Nephelium mutabile*) from the Philippines. Five living specimens of the earwig *Euborellia plebeja* (Dohrn) were taken at Blaine, Wash., on September 27, 1938, in packing material for lily bulbs in cargo from Japan. Living specimens of the coccid *Orthezia praelonga* Dougl. arrived at Nogales, Ariz., on November 15, 1938, on a walnut leaf in baggage from Mexico. A living larva of the European corn borer (*Pyrausta nubilalis* Hbn.) was collected on September 7, 1938, in a sunflower stalk in the field at Sinajana, Guam. Living soldiers and workers of *Microcerotermes exiguus* Hag. were intercepted at Washington, D. C., on November 4, 1938, on *Brownea* seed in the mail from the Canal Zone. This termite is recorded from Central and South America.

DOMESTIC PLANT QUARANTINES

Early grasshopper hatch expected.--Grasshopper eggs were in an advanced stage of embryonic development in many southern areas by the latter part of March, according to reports of field supervisors. The long period of warm weather last fall prolonged the egg-laying period and partially incubated the eggs so that the hatch is expected after only a short period of warm weather. Farmers and county agents are encouraged to locate egg-beds of the migratory species in order that newly hatched hoppers may be baited promptly.

Grasshopper field offices established.--To facilitate the baiting operation in the approaching season, in the areas heavily infested with the migratory species of grasshoppers, suboffices of the field headquarters at Minneapolis are being established at Amarillo, Tex., Pueblo, Colo., Mandan, N. Dak., Aberdeen, S. Dak., Miles City, Mont., Glasgow, Mont., and Sundance, Wyo.

Workers organize for grasshopper control.--Owing to the necessity of greatly modifying the earlier tentative plans for extensive grasshopper baiting on range and idle lands, revised programs of control operations are now being worked out with the various States. The program as now planned provides for (1) adequate crop protection throughout the infested region as in past years; (2) Federal participation in the distribution of bait materials and assistance in control of grasshoppers on idle or reverted and abandoned farm land in restricted areas in Wyoming, Montana, North Dakota, and South Dakota, where local farm labor is inadequate to do the baiting; and (3) limited Federal participation in the control of migratorial hoppers on range land in New Mexico, Colorado, and the Panhandles of Texas and Oklahoma. Special conferences have been held at St. Paul, Minn., Dickinson, N. Dak., and Santa Fe. N. Mex. Organizational and educational activities of field supervisors and State leaders throughout the infested areas are progressing rapidly. Sixty Federal entomologists and field supervisors are now assigned throughout the region. Bait materials, sufficient to make 20,000 tons of mixed bait, have been purchased since January 1. This, with the carry-over from last year, makes available approximately 90,000 tons at this time. Shipping to points in the Southwest was begun early in April.

Mormon crickets hatching.--Mormon crickets were hatching at Pasco, Franklin County, Wash., on March 21, according to a report authenticated by the field project leader. The second week in April they were hatching in all 11 infested States and it is expected that control operations will be under way between April 15 and May 1.

Mormon cricket control plans.--Plans for conducting cooperative operations for the control of Mormon crickets in 1939 have been drawn up with the States of Oregon, Washington, Wyoming, Montana, Nevada, Idaho, South Dakota, and Utah. Thirty-five Federal entomologists and supervisors are now actively engaged with State leaders in organizational work throughout the area, and plans are being worked out, in turn, in the several counties participating in the work. The protection of crops from destruction is the primary aim of the program, as in 1938. The type of work will also be similar to that of last year. In general, it is proposed to reduce labor to a minimum by the use of power dusters. The use of barriers as a supplement to dusting will be encouraged. In several areas it will be efficient and economical to destroy cricket bands in or near breeding grounds early in the season before they migrate. Such early clean-up activities will also be attempted in certain areas where destruction of range plants by the crickets is severe and where it is believed they will migrate later to crop lands.

White-fringed beetle control activities.—The movement of restricted articles in March was light, except for the shipping of nursery stock from such centers as New Orleans and Mobile. Over 40,000 plants were moved, under authorization, from New Orleans nurseries to retail establishments, and over 4,000 permits were issued for movement of restricted products from the area. Two New Orleans nurserymen have fumigated nearly 46,000 square feet of soil in certified heeling-in areas. No adult white-fringed beetles had been seen at New Orleans since February 15, according to a field report dated April 6. For the movement of nursery stock from Baldwin and Mobile Counties, Ala., consisting chiefly of camellias and azaleas, nearly 700 permits were issued in March. Preliminary to active control operations, property owners in the infested areas are being contacted and permission is being obtained from residents of the various towns to proceed with such work. Farmers and home gardeners are, for the most part, adopting recommended cultural practices in spring planting. Limited inspection for larvae resulted in finding in March slight increases to known infested areas at Laurel, Miss., and Florala, Ala.

March work on the sweetpotato weevil.—The principal activities on sweetpotato weevil control in March were the cleaning of places of storage of sweetpotatoes on the infested properties, and those adjacent within eradication areas, making further inspections in such areas, destroying food plants on infested properties, and enforcing the quarantine regulations. Inspection was made of approximately 9,000 bushels of seed tubers in commercial storage at points in Texas, of which more than 2,000 bushels were sold in the eradication areas. These activities of the month were conducted jointly with the States in 5 counties in Georgia, 9 in Mississippi, 2 in Alabama, and 4 in Texas. Inspections were made on 417 properties, of which 19 were found infested. State-sponsored W. P. A. crews cleaned up infested premises in Baldwin and Mobile Counties, Ala., and trapped 1,092 weevils on 60 properties.

Spring inspections for peach mosaic.—With peach trees in full bloom in the Southern States in the first week in April, inspections for peach mosaic were begun in eastern Texas, to be extended a little later into the El Paso area and thence into California, Arizona, Utah, New Mexico, Oklahoma, and Colorado, with the assistance of those States. In accordance with the revised quarantines adopted by practically all States, it will be necessary to complete the inspection of the environs of nurseries and budwood sites prior to May 15.

Progress in peach-tree-removal work.—The month of March marked the destruction of over 1,270,000 peach trees which were diseased, abandoned, or escaped. Of special interest was the work in the Banning Heights District of Riverside County, Calif., where for the first time since the history of the project, all mosaic-diseased peach trees were removed. Many new peach orchards are being planted in this district and the growers are considering the forming of a pest-free area. Similar work for the control of the phony peach and peach mosaic diseases was conducted in March in Alabama, Arizona, Arkansas, California, Colorado, Georgia, Mississippi, South Carolina, Tennessee, Texas, and Utah, with an average of 546 relief laborers.

Progress in citrus canker eradication.—With a force of 5 to 8 Federal-State inspectors, 2 Louisiana parishes have been inspected since the work was resumed in that State on January 16, and 10 formerly infected properties were thoroughly reinspected. A great many trees of *Citrus trifoliata*, as well as edible citrus of numerous varieties, were found on various estates and home sites on 2 islands off the coast of Iberia Parish. In Texas the Brazoria and Galveston County areas are being strip-worked by W. P. A. crews and inspectors, searching for escaped Citrus trifoliata seedlings. On properties where canker has been previously found the crews crawl over the entire properties in search of tiny trees of that species. Nearly 2,000 properties were inspected in the 2 States in the month ended March 25, and no canker was found. Nearly 114,000 abandoned citrus trees in Texas were destroyed.

Japanese beetle traps placed.--Through the Division of Cereal and Forage Insect Investigations, Japanese beetle traps are being forwarded for operation to 13 points in the South and West, where trappings may be observed.

Transit-inspection work.--A truck strike in parts of three New England States the last week in March caused a tremendous increase in railway shipments through Boston, according to the transit inspector in that city. Fifty percent of the violations intercepted there in March consisted of forest-plant products. Boston and New York inspectors reported that nursery-stock shipping was very light in March, with the prolonged winter weather. Pittsburgh and Chicago inspectors reported a gradual incline since the first of the month, with Chicago shipments increasing in the latter half of the month four and one-half times the number in the first half, as reported by railway companies. Mail shipments increased four and one-half times over those in February. The inspection force in New York City was increased in the early part of March by the assignment by the Japanese beetle control office, of two inspectors to check the spring movement of nursery stock. Violations intercepted in New York in March included two on which the void date of the Japanese beetle certificates had been changed by someone other than the certifying inspectors. The shipments were turned back and investigation is being made.

Air-mail shipments checked.--Air-mail shipments of cut flowers reported in transit at the Chicago airport in March totaled 236. They originated in 19 States, Canada, and Hawaii and were consigned to 25 States and Canada. Officials of the Air-Mail Field Terminal at Chicago make a practice of reporting such shipments by telephone to the transit-inspection office in that city, for such inspection as may be desired.

Citrus whiteflies intercepted.--E. A. Burns, transit inspector in charge at New York City, recently found flies in a shipment of gardenias from a Georgia greenhouse, which were determined as Dialeurodes citri Ashm.

Quarantine changes.--Circulars of the B. E. P. Q. series have recently been issued as follows: Nos. 492, 493, and 494, lifting certain treatment requirements for the pink bollworm of cotton, and No. 495 relating to the Mexican fruitfly, extending the harvesting season for grapefruit and requiring sterilization of such fruit after April 11, 1939.

INSECTICIDE INVESTIGATIONS

New insecticides and fungicides.--The high insecticidal value of carbon disulfide has been known for many years. Recently, certain derivatives of carbon disulfide, called xanthates, have been tested for pest control and some of these have been found to possess considerable value. R. H. Carter, of this Division, on

March 14, 1939, was granted U. S. patent 2,150,759, which covers the composition of a fungicide with a compatible insecticide, said composition comprising cuprous amyl xanthate as its essential active fungicidal ingredient and di-amyl xanthogen as its essential active insecticidal ingredient, in the approximate molecular ratio of two to one, respectively. This composition has given promising results in preliminary tests against the tobacco hornworm, the southern armyworm, the cross-striped cabbage worm, and the imported cabbage worm. In laboratory tests it was also found toxic to the organisms of peach brown rot and apple bitter rot. Spraying tests were made on the foliage of certain trees. After several weeks' exposure no burning was evident on apple, pear, or lilac, but peach foliage was slightly injured.

BEE CULTURE

Weather factors have dual influence on honey production.--It has long been known that weather factors exert a dual influence on honey production by affecting both nectar secretion and flight activity of bees, but it has not been possible to separate clearly or evaluate the relative importance of the two phases of this influence. An intensive study several years ago on the effect of weather factors on the flight activity of honeybees marked the beginning of an effort by the Bureau to solve this problem. This effort is now being continued at the Pacific Coast Bee Culture field laboratory in Davis, Calif., by a study of the effect of weather and other external factors on nectar secretion. The poinsettia is the principal plant being used in this investigation since it is readily grown under controlled greenhouse conditions, has large exposed nectaries, and furnishes appreciable amounts of nectar. The work is in charge of G. H. Vansell who reports as follows concerning preliminary observations:

"Temperature--It is evident that temperature has a profound influence on nectar secretion in poinsettia blossoms. Plants taken to the bee house, where the night temperature dropped to from 45° to 47° F., entirely ceased to secrete after the first 24-hour period. In the 'cold room' of the greenhouse without artificial heat from 5 p.m. to 8 a.m. the quantity of nectar secreted was but a fraction of that in the warm room. The door was open between the two rooms from 8 a.m. to 5 p.m., so that the day temperatures, even on days without sun, were much above those in the bee house. During sunny days the 'cold room' became much warmer than the minimum in the warm room.

"Humidity--Humidity greatly influences the quantity of nectar per blossom, but the sugar content diminished with the quantity increase. When the relative humidity was near 100 percent (inside a sweating glass container) the sugar concentration was from 12 to 15 percent, whereas at times under warm room, greenhouse conditions in midafternoon of a sunny day it reached 60 percent. The influence of humidity on nectar concentration for one period (December 8) is shown in the following table:

Position of plant during last 24-hour period	Sugar concentration in nectar	Temperature	Relative humidity	Remarks
		°F.		
Sweating glass box in warm room----	12.8	70, thermograph	Probably near 100	Reading taken consecutively, fog hides sun.
Fully exposed in cold room-	28.5	48, approximately	Higher than in warm room	Reading taken consecutively, fog hides sun.
Fully exposed in warm room-	61.6	70, thermograph	70 by hygrograph	---

"Air pressure--Plants were simultaneously subjected to normal air, positive, and negative pressures in the warm room. The positive and negative plants were reversed in due course. In all but one instance plants under pressure apparently yielded an increased quantity of nectar and sugar.

"Light--Exclusion of light by surrounding glass boxes with two thicknesses of light-excluding black cloth stopped nectar secretion after 24 to 36 hours. Not only did secretion cease, but the nectar lips moved together, closing the cup. Removal of a cessated plant to the light caused reopening of the cups with revival of secretion.

"One thickness of cloth (partial light) was insufficient to stop secretion although the quantity was greatly reduced. Subsequent exposure to full light revived secretion to equal that in the check plants. Actual sunlight did not appear necessary for nectar secretion, as partially darkened plants secreted as did the general lot during several days of fog.

"Daily fluctuation in nectar secretion--Unequal quantities of nectar were harvested from day to day. Secretion was evidently most copious at night following unclouded days, but was nearer equal each 12-hour period (8 a.m. to 8 p.m.) during foggy periods. Temperature may have contributed to this, as the warm room temperature during sunny days was far above the average for the nights and foggy days. The difference between night and day secretion was greater than the following table indicates as the actual dark period at this season is much the longer. The nectar produced during day and night periods for 3 days, beginning December 16-19, 1938, was as follows:

Plant	Day 8 a.m.-6 p.m.	Night 8 p.m.-8 a.m.	Day 8 a.m.-8 p.m.	Night 8 p.m.-8 a.m.	Day 9 a.m.-7 p.m.	Night 7 p.m.-8 a.m.
(Plant X):						
Amount (milligrams)-----------	2.4	3.0	1.6	3.2	2.25	2.5
Concentration (percent)-------	55.7	33.5	55.0	37.0	40.70	27.1
(Plant Y):						
Amount (milligrams)-----------	1.9	2.5	1.9	3.0	1.60	1.7
Concentration (percent)-------	59.1	44.5	60.4	50.8	43.20	34.0

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"*Variation in concentration of nectar in different plants.*--Data were obtained on four plants sampled simultaneously on four consecutive days. Unfortunately, the humidity data cannot be correlated because the hygrograph was found to be registering improperly at the time. Irrespective of this, however, these plants were side by side in the warm room. The sugar figures were obtained by a refractometer without temperature correction, but again the daily readings were immediately consecutive and therefore at the same temperature, practically speaking. The data on sugar concentrations in different poinsettia plants are shown in the following table.

Plant No.	Sugar concentration on--			
	Nov. 30	Dec. 1	Dec. 2	Dec. 3
	Percent	Percent	Percent	Percent
5--------	54.0	56.2	57.3	47.0
6--------	40.3	45.2	43.6	38.5
7--------	43.3	47.0	45.2	37.6
8--------	46.0	47.6	46.8	39.7 "

IDENTIFICATION AND CLASSIFICATION OF INSECTS

The proper name for the corn ear worm.--For three-quarters of a century (1826-1903) the corn ear worm was known as *Heliothis armigera* (Hubner) and had an extensive, economic literature under that name. It was figured originally as *Noctua armigera* by Hubner between 1803 and 1808 (Samml. Eur. Schmett. Noctuae, pl. 79, fig. 370). In 1826 it was referred to *Heliothis* Ochsenheimer (1816) by Treitschke (Schmett. Eur. vol. 5, pt. 3, p. 215). The combination was not disturbed until 1903, when Hampson (Cat. Lep. Phal. B. M., vol. 4, p. 45) rejected Ochsenheimer's genus on the ground that it was not published in 1816 and must date from Treitschke 1826. Hampson followed a rigid "first species rule" in the selection of genotypes regardless of any previous genotype selections. In this instance he cited *Noctua cardui* Esp. as the type of *Heliothis* Tr., changing the concept of the genus and removing *armigera*, *virescens*, and allied species to the genus *Chloridea* Westwood. Also on p. 657 of vol. 4 of his Catalogue, Hampson resurrected an older specific name, *obsoleta* Fabricius ("*Bombyx obsoleta* F.," Ent. Syst. vol. 3 (1), p. 456. 1793). In his generic change Hampson found few followers for, in the sense of the code, *Heliothis* must date from Ochsenheimer 1816, who had listed under his proposed name several species, among them *Phalaena Noctua dipsacea* L. which was selected as genotype by D. Thon before Hampson's selection of *cardui*. In his choice of a specific name (*obsoleta* F.) for the corn ear worm Hampson has been followed by most lepidopterists since 1903, and our latest American list (McDunnough, "Check list of the Lepidoptera of Canada and the United States" part 1, 1938) gives the combination as *Heliothis obsoleta* F. However, in 1935 ("Insects of Samoa", part 3, fasc. 4, Lepidoptera: Heterocera, p. 196) Tams showed that the Fabrician name could not be used, since *Bombyx obsoleta* F. 1793 was a primary homonym of *Bombyx obsoleta* F. 1775 (Syst. Ent., p. 579, No. 77), a quite different insect, now listed in the Lymantriidae. The correct combination for the corn ear worm is *Heliothis armigera* (Hbn.).

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